Comparing the Maintenance Quality of Two Groups of Equipment: A Case of Water Chillers

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***Abstract*—In practice, air-conditioner service companies often wish to compare the maintenance quality of two groups of equipment. One of the feasible methods is to compare the survival rates at some specified survival times. However, differences in survival rate between two groups of equipment can change significantly depending on the chosen time. To overcome this problem, this study tried to find out a statistical test method for determining whether there is a statistically significant difference between the survival functions or hazard functions of two groups of water chillers. This study collected two sets of data on the maintenance of water chillers in the stations of the Red Line and the Green Line, Taipei Metro, Taiwan. Then, survival analysis was performed to estimate the survival rates for the two groups of water chillers and identify the probability model of the interarrival time of equipment failure. This study used the Kaplan-Meier method to produce the survival curves for water chillers and thereby comprehend the cycle of maintenance and repairs. Finally, the differences in survival rate between the two groups of water chillers were examined and used to infer the difference in maintenance quality. Research results show that the survival time data of water chillers satisfy the proportional hazard model. The log-rank test can be used to verify the difference in maintenance quality between two groups of water chillers.**

***Index Terms*— Water chillers, maintenance quality, survival rate.**